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FOAM GLASS, A NEW SOVIET INSULATING MATERIAL

D. Arkad'yev

For many years, engineers, glassworkers, and scientific workers under the direction of Prof I. I. Kitaygorodskiy have worked on the problem of creating a light new form of insulating glass to replace construction brick. This work has been carried on at the laboratories of the Moscow Order of Lenin Chemico-technological Institute imeni D. I. Mendeleyev, at a test plant in Moscow, and at a glass plant in the Donbass.

As decided after thousands of tests, a gas-forming substance is introduced into the glass mass, which liberates gas during subsequent baking of the glass mass to make the glass porous and light. The new foam glass is opaque and externally resembles an ordinary sponge or pumice stone. All other valuable properties of glass incombustibility, resistance to acids, and water impermeability, are retained.

The new building material is produced in the following way: Ordinary glass is pulverized in a special breaker and mixed with a small amount (0.5-2.5%) of some substance which will produce gas when heated, such as coal, calcium carbonate, marble, or others. Metal or ceramic forms are charged with the mixture and set in a special furnace in which the temperature is gradually increased. At a temperature of 550 to 600 degrees, the powdered glass particles fuse to form a solid mass; but after 60 to 70 minutes the temperature reaches 750 to 780 degrees and the gas-forming agent begins to decompose. The liberated gas, in attempting to force its way out of the fused mass, blows it apart, giving the melted glass porosity and lightness.

The process of decomposition of the gas-forming agent lasts another 15 to 20 minutes. Then the temperature is gradually decreased, cooling or fritting begins, and after 16-18 hours the foam glass is ready. It needs only to be cut into blocks of the required size and sent to the construction area.

This glass can actually be sawed. While retaining all the best properties of ordinary glass, foam glass differs from ordinary glass by its high mechanical strength, and its ability to be sawed, planed, and drilled by ordinary tools.

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Foam glass has many uses due to its properties. Its main use is as a good heat-insulating building material. When filled with it, the walls of frame houses will be only half as thick as brick and will retain heat well, in addition to being completely soundproof.

Foam glass is very important in the construction of tall buildings in reducing the weight and eliminating the need for heavy and expensive building materials. Foam glass will be used for floors of buildings in the northern regions and as a sound absorber in the lining of walls and ceilings of radio stations, noisy shops, etc. It will also be used in the construction of cooling plants and warehouses. It is much more durable than the insulators used up to the present for lining these buildings (peat, cork, etc.). Foam glass floats on water because of its light weight (four times lighter than water) and thus can be used for lifebelts, buoys, etc. The temperature in boiler spaces can be reduced considerably by using foam glass for the outer walls of steam boilers

For devising this new insulating material, Prof I. I. Kitaygorodskiy, V. P. Surovtsov, builder of the test plant of the All-Union Scientific-Research Glass Institute; P. A. Karyagin, a shop chief in the "Avtosteklo" Plant; and A. M. Ponomarenko, formerly a shop chief in the same plant, were awarded a Stalin prize in 1950.

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